

CLAIMS

1. An information recording method comprising the steps of:

5 (a) generating a pulse train including a first pulse and a second pulse; and

(b) forming at least one of a recording mark and a space onto an information recording medium by irradiating the pulse train onto the information recording medium while rotating the information recording medium at a certain linear velocity,

10 wherein the first pulse is a pulse for forming a central portion of the recording mark, among the recording mark and the space,

15 the second pulse is a pulse forming a portion other than the central portion of the recording mark, among the recording mark and the space, and

the step (a) includes a step of determining a power level of the first pulse in accordance with the linear velocity and a power level of the second pulse.

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2. An information recording method according to claim 1, wherein:

25 the second pulse includes a third pulse for forming at least one of a leading portion of the recording mark and a trailing portion of the recording mark, and

a power level of the first pulse becomes equal to a power level of the third pulse in accordance with an increase in the linear velocity.

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3. An information recording method according to claim 1, wherein:

the second pulse includes a third pulse for forming one of a leading portion of the recording mark and a trailing

portion of the recording mark, and

a power level of the third pulse is greater than a power level of the first pulse.

5 4. An information recording method according to claim 1, wherein:

the second pulse includes a third pulse for forming a leading portion of the recording mark and a trailing portion of the recording mark, and

10 a power level of the third pulse is greater than a power level of the first pulse.

5. An information recording method according to claim 1, wherein:

15 the power level of the first pulse is determined in accordance with the following formula:

$$P_m = \alpha(v) \times (P_p - P_e) + P_e,$$

the second pulse includes a third pulse for forming at least one of a leading portion of the recording mark and a trailing portion of the recording mark and a fourth pulse for forming the space,

20 where P_m denotes the power level of the first pulse, $\alpha(v)$ denotes a function of the linear velocity, P_p denotes a power level of the third pulse, and P_e denotes a power level of the fourth pulse, and

25 the power level of the third pulse is greater than the power level of the first pulse.

30 6. An information recording method according to claim 1, wherein:

the power level of the first pulse is determined in accordance with the following formula:

$$P_m = \alpha(v) \times P_e,$$

the second pulse includes a fourth pulse for forming the space, and

where P_m denotes the power level of the first pulse, $\alpha(v)$ denotes a function of the linear velocity, and P_e denotes
5 a power level of the fourth pulse.

7. An information recording method according to claim 1, wherein:

the power level of the first pulse is determined in
10 accordance with the following formula:

$$P_m = \alpha(v) \times P_p,$$

the second pulse includes a third pulse for forming at least one of a leading portion of the recording mark and a trailing portion of the recording mark,

15 where P_m denotes the power level of the first pulse, $\alpha(v)$ denotes a function of the linear velocity, and P_p denotes a power level of the third pulse, and

the power level of the third pulse is greater than the power level of the first pulse.

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8. An information recording method according to claim 1, wherein:

the power level of the first pulse is determined in accordance with only the power level of the second pulse,
25 when the linear velocity is at least one of near maximum linear velocity and near minimum linear velocity.

9. An information recording method according to claim 1, wherein:

30 the power level of the first pulse is determined in accordance with only the power level of the second pulse, when the linear velocity is near intermediate linear velocity.

10. An information recording medium for recording information, wherein:

at least one of a recording mark and a space is formed onto the information recording medium by irradiating a pulse train onto the information recording medium while rotating the information recording medium at a certain linear velocity, the pulse train includes a first pulse and a second pulse,

the first pulse is a pulse for forming a central portion of the recording mark, among the recording mark and the space,

the second pulse is a pulse for forming a portion other than the central portion of the recording mark, among the recording mark and the space,

a power level of the first pulse is determined in accordance with the linear velocity and a power level of the second pulse, and

the information recording medium has an area on which the power level of the first pulse is recorded.

11. An information recording medium according to claim 10, wherein:

$\alpha(v)$ is recorded in the area, and

$\alpha(v)$ denotes a relationship between the linear velocity and the power level of the second pulse.

12. An information recording apparatus comprising:

a pulse train generating means for generating a pulse train including a first pulse and a second pulse; and

a forming means for forming at least one of a recording mark and a space onto the information recording medium by irradiating the pulse train onto the information recording medium while rotating the information recording medium at

a certain linear velocity,

wherein the first pulse is a pulse for forming a central portion of the recording mark, among the recording mark and the space,

5 the second pulse is a pulse for forming a portion other than the central portion of the recording mark, among the recording mark and the space, and

 the pulse train generating means includes a power level determining means for determining a power level of
10 the first pulse in accordance with the linear velocity and a power level of the second pulse.

13. An information recording method comprising the steps of:

15 (a) generating a pulse train including a first peak pulse and a second peak pulse; and

 (b) forming at least one of a long recording mark, a short recording mark and a space onto an information recording medium by irradiating the pulse train onto the
20 information recording medium while rotating the information recording medium at a certain linear velocity,

 wherein the first peak pulse is a pulse for forming the short recording mark and the second peak pulse is a pulse for forming the long recording mark, and

25 the step (a) includes a step of determining a power level of the first peak pulse in accordance with the linear velocity and a power level of the second peak pulse.

14. An information recording method according to claim 13,
30 wherein:

 the power level of the first peak pulse becomes equal to the power level of the second peak pulse in accordance with a decrease in the linear velocity.

15. An information recording method according to claim 13, wherein:

5 a length of the short recording mark is a length of the shortest recording mark formed based on a modulation code for recording.

16. An information recording method according to claim 13, wherein:

10 a length of the short recording mark is longer than or equal to a length of the shortest recording mark formed based on a modulation code for recording, and a length of the short recording mark is shorter than a length of the long recording mark.

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17. An information recording method according to claim 13, wherein:

the power level of the first peak pulse is determined in accordance with the following formula:

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$$Pps = \beta(v) \times Ppl,$$

wherein Pps denotes the power level of the first peak pulse, $\beta(v)$ denotes a function of the linear velocity, and Ppl denotes the power level of the second peak pulse.

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18. An information recording method according to claim 13, wherein:

the power level of the first peak pulse is determined in accordance with the following formula:

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$$Pps = \beta(v) \times (Ppl - Pe) + Pe,$$

wherein Pps denotes the power level of the first peak pulse, $\beta(v)$ denotes a function of the linear velocity, Ppl denotes the power level of the second peak pulse, and Pe denotes a power level of the pulse for forming the space.

19. An information recording method according to claim 13, wherein:

5 the power level of the first peak pulse is determined in accordance with the following formula:

$$Pps = \beta(v) \times Ppl + Ppl,$$

 wherein Pps denotes the power level of the first peak pulse, $\beta(v)$ denotes a function of the linear velocity, and Ppl denotes the power level of the second peak pulse.

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20. An information recording method according to claim 13, wherein:

15 the power level of the first peak pulse is determined in accordance with only the power level of the second peak pulse, when the linear velocity is at least one of near maximum linear velocity and near minimum linear velocity.

21. An information recording method according to claim 13, wherein:

20 the power level of the first peak pulse is determined in accordance with only the power level of the second peak pulse, when the linear velocity is near intermediate linear velocity.

25 22. An information recording medium for recording information, wherein:

30 at least one of a long recording mark, a short recording mark and a space is formed onto the information recording medium by irradiating a pulse train onto the information recording medium while rotating the information recording medium at a certain linear velocity,

 the pulse train includes a first peak pulse and a second peak pulse,

the first peak pulse is a pulse for forming the short recording mark and the second peak pulse is a pulse for forming the long recording mark,

5 a power level of the first peak pulse is determined in accordance with the linear velocity and a power level of the second peak pulse, and

the information recording medium has an area on which the power level of the first peak pulse is recorded.

10 23. An information recording medium according to claim 22, wherein:

$\beta(v)$ is recorded in the area, and

15 $\beta(v)$ denotes a relationship between the linear velocity, the power level of the first peak pulse and the power level of the second peak pulse.

24. An information recording apparatus comprising:

20 a pulse train generating means for generating a pulse train including a first peak pulse and a second peak pulse; and

25 a forming means for forming at least one of a long recording mark, a short recording mark and a space onto the information recording medium by irradiating the pulse train onto the information recording medium while rotating the information recording medium at a certain linear velocity,

wherein the first peak pulse is a pulse for forming the short recording mark and the second peak pulse is a pulse for forming the long recording mark, and

30 the pulse train generating means includes a power level determining means for determining the power level of the first peak pulse in accordance with the linear velocity and the power level of the second peak pulse.